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SYNTHESIS OF CATIONIC LIPIDS FOR NON-VIRAL THERAPEUTIC APPLICATIONS

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Cationic lipids maybe used as carriers of genes for delivery to cells in gene therapy. The goal of my research is to synthesis additional non-toxic cationic lipids, which are able to deliver DNA into cells more efficiently. Lipids containing a cationic head group lead to the binding of the lipid to the DNA. I synthesized *O*-ethyl-1, 2-dioleoyl-*sn*-glycero-3-phosphocholine using ethyl-trifluromethyl sulfonate (triflate) and 1, 2 dioleoyl-*sn*-glycero-3-phosphocholine. *O*-(1-pyrenebutyl)-1, 2-dioleoyl-*sn*-glycero-3-phosphocholine and *O*-cholestanyl-1, 2-dipamitoyl-*sn*-glycero-3-phosphocholine are new compounds I isolated and synthesized using the corresponding alcohol, triflic anhydride and 1,2-dioleoyl-*sn*-glycero-3-phosphocholine and 1,2-dipamitoyl-*sn*-glycero-3-phosphocholine respectively. The reactions were monitored at different times using thin layer chromatography (TLC). When TLC revealed the reaction progressed sufficiently, the lipids were purified using silica gel column chromatography and eluting with chloroform/methanol mixtures. The concentration of the lipids was determined by a spectrophotometric phosphate assay. By light microscopy, *O*-(1-pyrenebutyl)-1, 2-dioleoyl-*sn*-glycero-3-phosphocholine and *O*-cholestanyl-1, 2-dipalmitoyl-*sn*-glycero-3-phosphocholine were seen to form lamellar phases, although the latter has a phase transition above room temperature. One of the lipids (the pyrenebutyl compound) has been tested for transfection and displayed activity.